

ZTERM64

Communications Software
for the TS2068 Computer with
OS-64 Operating System Cartridge
and WC2050 Modem.

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Zebra Systems, Inc.

78-06 Jamaica Ave.
Woodhaven, NY 11421

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OS-64 Cartridge Required

ZTERM64 requires you to use the OS-64 Operating Systems Cartridge, (not included).

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Introduction

Congratulations on your purchase of the best modem software available for your TS2068.

Chances are you are one of the thousands of Timex TS2068 users who have been successfully using their WC2050 modems with the MTERM/T and MTERM-II software written by Micro Systems Software. Therefore even though Zebra Systems wrote ZTERM64 totally from scratch, we have tried to make ZTERM64 more like an MTERM-II with added features, than like a totally new program. We hope that this approach will make the transition to ZTERM64 easy for you.

The three main reasons we wrote ZTERM64 are:

- * 64 Column Screen Support
- * Built in Xmodem Protocol
- * Support for cassette, A&J, and Zebra FDD

The 64 column display format allows you to get twice as much information on a line, as with the MTERM software. The use of Xmodem protocol should facilitate reliable uploading and downloading. And, cassette, A&J micro-drive, and Zebra Floppy Disk System users are supported. In fact, we are particularly proud that we now have a terminal program that begins to tap some of the ZFDD's power. Zebra disk system owners can now use the Xmodem protocol and automatically upload files as long as 150K bytes, directly to disk.

HINTS FOR USING THIS MANUAL

Since the structure and function of ZTERM64 is defined by its menu screens, this manual consists of presentations of typical screens, followed by descriptions of them. Therefore, the best way to use this manual is to **LOOK CAREFULLY AT THE SAMPLE MENUS** and refer to them when you read the descriptive text following them. The **TABLE OF CONTENTS** will serve as your guide to randomly accessing a particular topic.

Program Configuration

ZTERM64 was written to support the most common TS2068 storage devices and printer interfaces. Here is how you can tell ZTERM64 about your particular computer configuration.

Load your original copy of ZTERM64. You will be prompted by the loader for information about your storage device and printer interface. Answer the questions and then make a backup copy of the program onto a fresh cassette, microdrive cartridge, or floppy disk. Keep your original Zebra Supplied cassette for archive purposes.

Storage Device & Printer Interface Configuration

The ZTERM64 loader will prompt you as follows for the type of printer interface that you have.

ENTER YOUR STORAGE DEVICE:

- 1 - TAPE
- 2 - A & J MICRO-DRIVE
- 3 - ZEBRA FLOPPY DISK SYSTEM

YOUR SELECTION ?

You will then be asked about your printer interface as follows:

ENTER YOUR PRINTER INTERFACE:

- 1 - AERCO
- 2 - TASMAN B
- 3 - TASMAN C
- 4 - A & J

YOUR SELECTION?

NOTE: Both OS64 and Z-Term64 assume you have an 80-column printer. They do not support the TS2040 or Alphacom 32 column printers.

Program Conventions

The following conventions are used throughout the Z-TERM64 software:

The ENTER Key

In general, the use of the ENTER key in response to a menu prompt will non-destructively return you to the previous prompt or higher level menu.

Upper Vs. Lower Case Characters

Although a given Z-TERM64 screen menu may indicate only upper or only lower case responses, in general Z-Term64 will accept either case interchangeably.

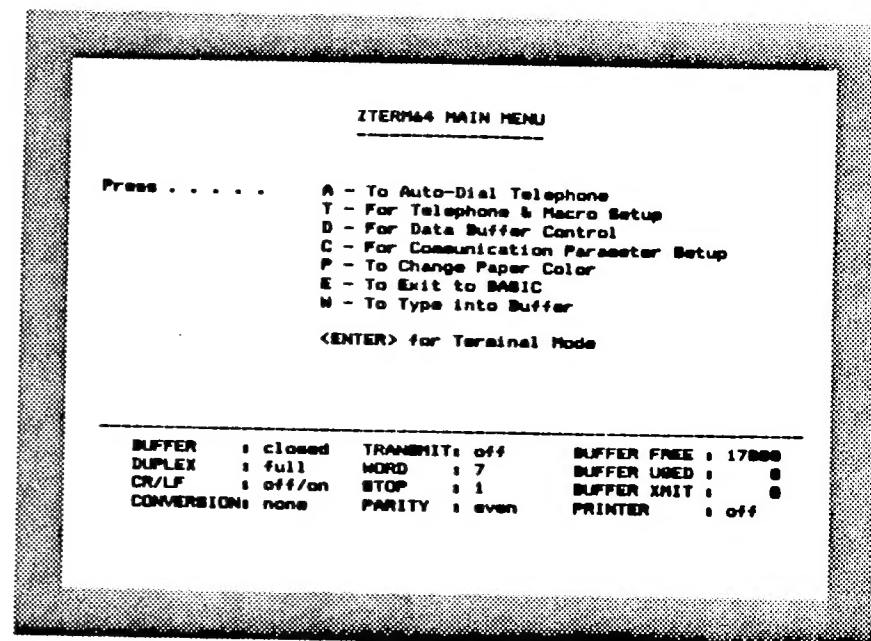
Error Checking for Invalid Prompt Responses

Where your responses are checked for validity and found to be in error, Z-TERM64 will simply re-prompt you.

Documentation Terminology

BREAK

All references to "BREAK" in this manual should be understood as meaning the simultaneous pressing of the CAP SHIFT and BREAK keys on the TS2068 keyboard.



The ZTERM64 main menu (shown above,) will be the first screen to appear when you run ZTERM64. The screen has three different parts worthy of your attention.

TOP OF THE SCREEN

The top of the screen contains the title of the menu screen and the list of menu choices.

BOTTOM OF THE SCREEN

The lower portion of the screen contains the status menu and is always present throughout the use of ZTERM64. The information in this display can be broken down into two categories. Information on your program and modem settings, and information on your buffer status.

The program and modem settings include:

DUPLEX CR/LF CONVERSION TRANSMIT
WORD STOP PARITY PRINTER

The buffer status indicators are:

| | |
|----------------------|-------------|
| BUFFER (Open/Closed) | BUFFER XMIT |
| BUFFER FREE | BUFFER USED |

The procedures for modifying the program and modem settings are described in later sections of this manual.

BOTTOM SCREEN LINE

The bottom line of the screen is the message and prompt line. After a menu selection, this line will be used to display any input prompts that may be necessary.

MAIN MENU COMMANDS

A - Auto-dial Telephone

Select this option to have the computer dial a phone number, either typed in from your keyboard, or selected from your directory.

T - Telephone & Macro Setup

Select this option to create or modify telephone directory entries and to define macro sequences. Selecting this option invokes sub-menus which will give you complete control over the telephone directory and the macro set.

D - Data Buffer Control

Selecting this invokes the data buffer control menu, where you can view, transmit, erase, etc.

C - Communication Parameter Setup

Selecting this invokes sub-menus where you can set various communication parameters (word length, parity, etc.).

P - Change Paper Color

After selecting this option you will be prompted to input your choice of paper color, 0 to 7. The ink color is automatically set to the complement of the paper color. You can refer to your TS2068 for the available color combinations.

E - Exit to BASIC

Selecting this option returns you to the TS2068 operating system. This can be useful for saving or loading BASIC programs to or from the buffer. ZTERM64 treats loads and saves as "CODE". From BASIC you can return to ZTERM64 by executing:

<RAND USR 47000>

W - Type into Buffer

This option is a fast way to enter terminal mode when you are off-line and want to type text into your buffer. Duplex mode is automatically set to "HALF" and the buffer is opened. You will be asked if you want to erase the buffer. After entering your answer, you will be placed in terminal mode.

SPECIAL DIALING CHARACTERS

P

Small or large letter P's can be embedded anywhere in the number dialing sequence. Each P causes a one second pause in the dialing sequence. These pauses may be required by certain long distance services.

R

The letter R can be used at the end of a dialing number sequence to request auto-redialing.

The auto redialing sequence is as follows:

- 1 - The message and prompt line goes blank when you hit ENTER after your number.
- 2 - The message "DIALING" will be displayed, followed by the digits as they are dialed.
- 3- Then "AWAITING CARRIER" will be displayed.
- 4- If a carrier is received the message "CONNECT" appears and a bell sound is outputed on the computer.
- 5 - When connected, the main screen will clear and an underline cursor will appear in the upper left hand corner. You are now in TERMINAL MODE.
- 5b - Alternatively you will not get a connect and the message " NO ANSWER OR BUSY", and a different audible prompt will be generated.
- 6b- If auto-re-dial is in effect, then the modem breaks the line and re-dials, otherwise you are returned to the dialing menu prompt.

You can interrupt dialing or re-dialing at any time by pressing the BREAK key.

| DIALING MENU | | | |
|--------------|---|------------------------|--|
| A | - | COMPUERVE | |
| B | - | ZEBRA SYSTEMS | |
| C | - | STONY BROOK UNIVERSITY | |
| D | - | | |
| E | - | | |
| F | - | | |
| G | - | | |
| H | - | | |
| I | - | | |
| J | - | | |
| K | - | | |
| L | - | | |
| M | - | | |
| N | - | | |
| R | - | Radial Last Number | |
| X | - | Manual Disconnect | |

| | | | | | | | | |
|------------|---|--------|----------|---|------|-------------|---|-------|
| BUFFER | : | closed | TRANSMIT | : | off | BUFFER FREE | : | 17000 |
| DUPLEX | : | full | WORD | : | 7 | BUFFER USED | : | 0 |
| CR/LF | : | off/on | STOP | : | 1 | BUFFER XMIT | : | 0 |
| CONVERSION | : | none | PARITY | : | even | PRINTER | : | off |

A - Number or Command (A-N,R,X)?

This menu is reached by selecting A for Auto-dial Telephone, in the main menu.

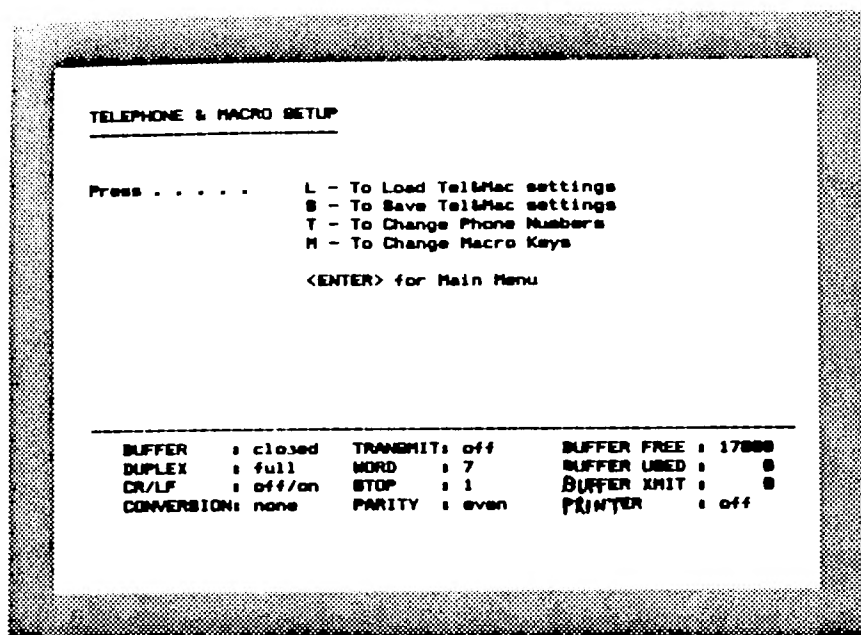
Directory Auto-dialing

By inputting a letter from A to N in response to the "Number or Command?" prompt, ZTERM64 will automatically dial the telephone number associated with the name listed next to that letter on the dialing menu.

Explicit Number Dialing

Alternatively you can dial manually by simply typing in the digits of a telephone number, in answer to the "Number or Command" prompt. For example to dial Zebra's BBS (only evenings or weekends, of course), enter

7182962229 followed by a carriage return.



This menu is reached by selecting T for (T)elephone & Macro Setup, in the Main Menu.

ZTERM64 allows you to store 14 different telephone numbers. For each of these numbers ZTERM64 also stores their associated communications settings and macro references. ZTERM64 contains 10 definable macro sequences for use by these 14 telephone numbers.

If you wish to store more than 14 telephone numbers ZTERM64 has a mechanism for doing this. ZTERM64 allows you to make additional directory/macro sets and save them as independent files. You may create as many of these as you wish.

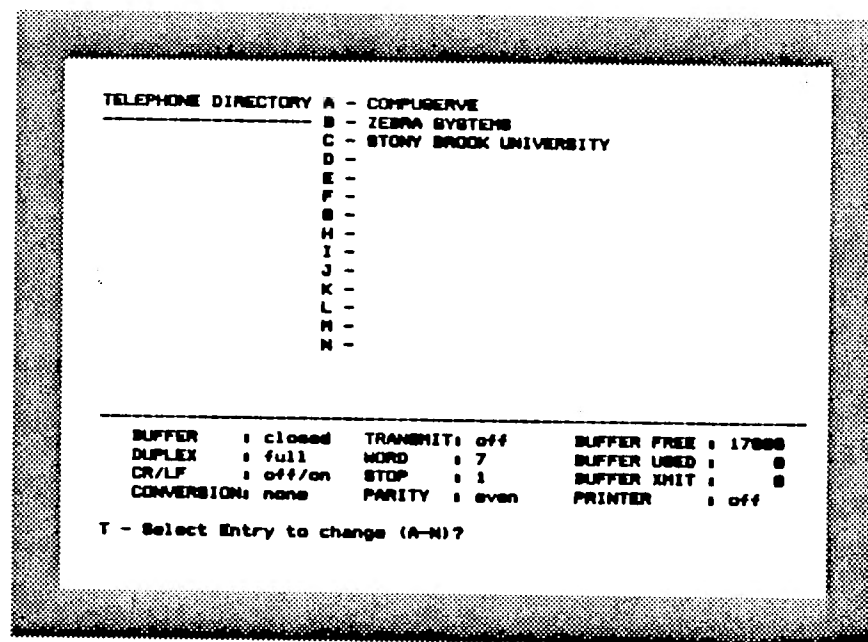
Load/Save Telephone & Macro Settings

To use or modify the information in a particular directory, it must be loaded into memory from your storage device. To do this use the L command. If you make any changes to the directory you will want to save it back to your storage media with the S command. The Load and Save options will prompt you for a file name.

The (L)oad and (S)ave commands transfer a complete telephone directory and macro set between your computer memory and your storage device.

Change Phone Numbers & Macros

The T and M commands take you to submenus for editing the directory phone numbers and macro sequences, respectively. See the following three sections for use of these editing menus.



The TELEPHONE DIRECTORY MENU shown above, is invoked by entering T from the telephone & Macro set-up menu.

To the "Select entry to change" prompt, simply enter the letter corresponding to the telephone number entry that you wish to modify. For example hit A, and you'll proceed to the telephone entry menu.

The serial parameters assigned to a particular telephone entry, will be sent out to the modem when that number is auto-dialed, and a connection is made.

D - SET MACRO-KEY

Enter a single digit 0 to 9, corresponding to the Macro sequence that you want transmitted in response to the receipt of a Control "E" after connection via autodialing a telephone directory number.

For example when you connect to the Zebra BBS, immediately after prompting you for your first name, the ZBBS sends a control E. If you set your Zebra BBS directory entry up properly, you can have it automatically respond to the control E with your first name and the rest of the necessary log on sequence.

You will be prompted for the name, number and serial parameters.

A - CHANGE NAME

Names can be up to 25 characters.

B - CHANGE NUMBER

Telephone numbers can be up to 30 characters long.

Valid characters include:

Digits 0 - 9

P for one second pause

R at the end of a number for auto redial.

C - SET SERIAL PARAMETERS

This format for your entry of parameters must be strictly observed; Word Length, Stop Bits, Parity.

Example 7,1,N (for 7 data bits, 1 stop bit, no parity).

VALID ENTRIES ARE:

Word Length 5,6,7, OR 8

Stop Bits 1 or 2

Parity E for even, O for odd, N for no parity

```

TELEPHONE ENTRY-B  Name      : ZEBRA SYSTE
                   Number    : 7182942229
                   Serial Params: 7,1,N
                   Macro Key   : 2

Press . . . . .  A - To change name
                  B - To change number
                  C - To set serial parameters
                  D - To set Macro Key

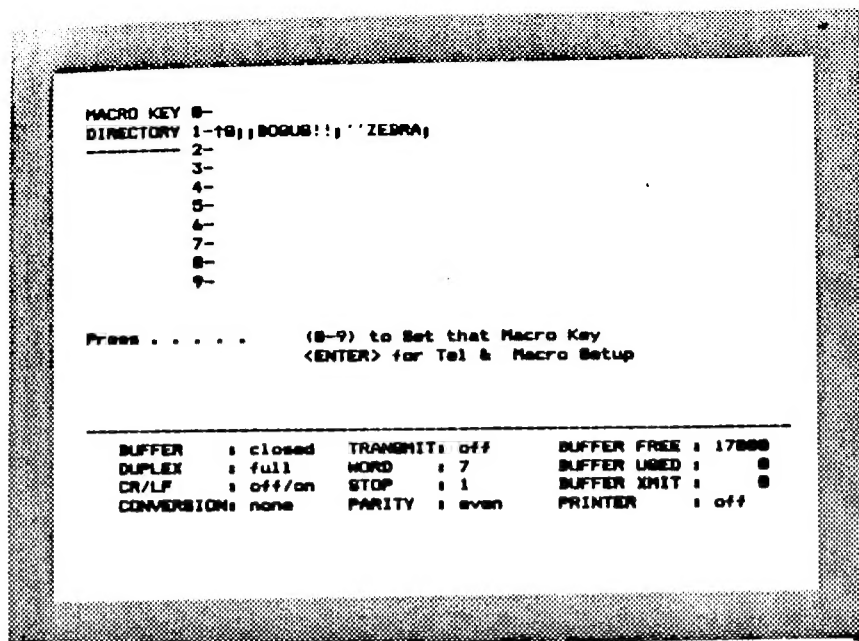
                  <ENTER> for Tel & Macro Setup

```

```

BUFFER   : closed  TRANSMIT : off    BUFFER FREE : 17888
DUPLEX   : full    WORD     : 7      BUFFER USED  : 0
CR/LF    : off/on  STOP     : 1      BUFFER XMIT  : 0
CONVERSION: none    PARITY   : even   PRINTER     : off

```



The rules for defining macros are as follows:

- * Up to ten macro sequences can be stored in each macro set.
- * Macros can be up to 52 characters in length.
- * All alpha and numeric characters are valid.
- * The following special characters can be embedded anywhere in the macro sequence:

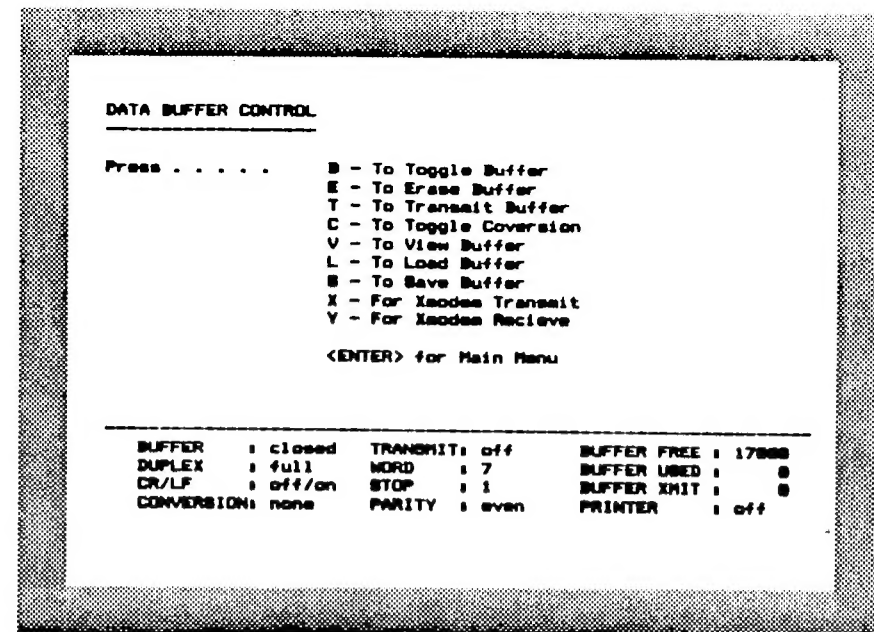
; (Semi-colon) - Produces Carriage Return
 ' (Apostrophe) - Produces 1 second pause
 ↑ (Up-arrow) - Indicates treat the following character as an ASCII control code.

The following special characters can be used only at the end of a macro sequence:

& (Ampersand) - Indicates include following macro
 L (Pound Sterling) - Indicates transmit buffer

Note1: As the ampersand (&) implies, macros can be strung together.

Note2: See appendix A for a complete list of standard control codes.



B - Toggle Buffer (Open/Close)

This command toggles the buffer open or closed with each press of the "B" key. Current buffer status is visible in the status menu.

E - Erase Buffer

After pressing the "E" key you will be prompted "ERASE BUFFER, ARE YOU SURE?" Respond (Y)ES or (N)O to erase the buffer.

T - Transmit Buffer

This command sends the contents of the buffer out over the phone line, as though it were typed continuously from the keyboard. After you press T, the following prompts will be generated:

T - Prompt character?

This question is being asked to find out whether or not the computer you are connected to sends out a special character after it receives a carriage return. Historically

this method was used to allow slow electromechanical devices extra time to catch up at the end of a line. If you are not expecting such a character just hit ENTER. If you are expecting a character then enter it.

T - Character Delay (0-255)?

This question refers to the amount of delay you wish to have between sending characters. In most cases just press ENTER for no added delay. The maximum number 255, produces a delay of approximately one-half second.

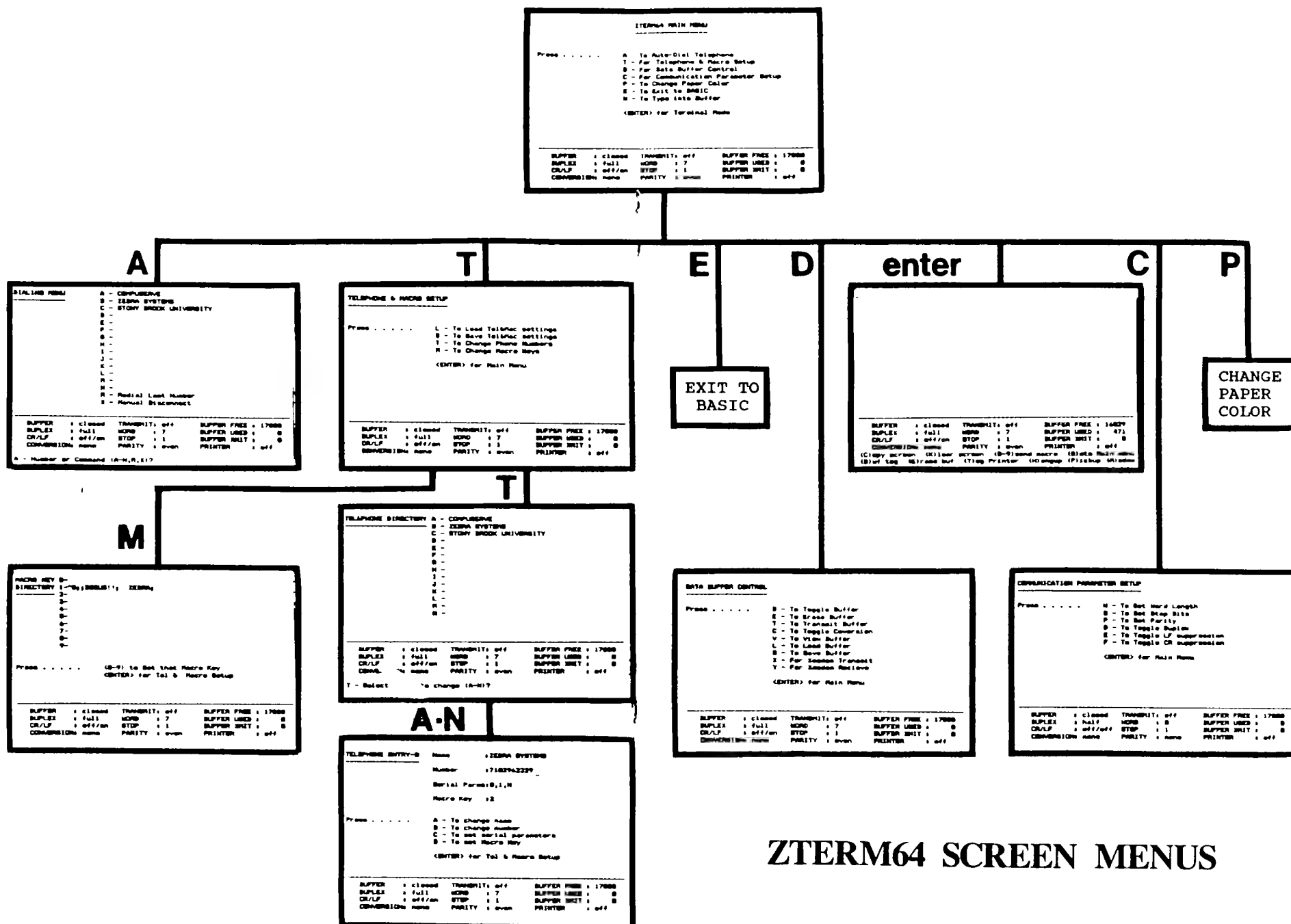
As soon as you respond to the character delay prompt, you will enter terminal mode and transmission will begin. You can stop the transmission before the end of buffer by pressing the BREAK key.

C - Toggle Conversion (None/Hex)

This command turns on or off the conversion of the buffer contents into HEX format. Hex format is a format of representing any 8-bit character by its two ASCII character Hexadecimal equivalent. For example, the escape character is the character with decimal value 27. The hexadecimal representation for it would be the characters 1 and B, because 1B Hex is 27 decimal.

There can be advantages to sending a 8-bit binary file in hexadecimal format. Let us say you want to download a machine code program from another computer. A machine language program can contain all possible 8-bit codes, some of which will be equivalent to ASCII control codes, end of file codes, etc. These bytes can cause problems because the program will act on them, corrupting the data. However, if you receive the machine code program in hexadecimal format, all the bytes will be converted to the ASCII characters 0 through 9 and letters A through F. Therefore, there will be no control codes in your data for the program to misinterpret.

When hex conversion is in effect, each byte of data transmitted by your computer is converted to two bytes of hex



notation. When you receive data with hex conversion, each two bytes received will be converted back into one binary byte. One drawback of this is that transmission will be slowed down by a factor of two.

You should use hex conversion if the data you are sending or receiving is not text. This includes such items as machine code, machine data, and tokenized BASIC programs.

Note: Xmodem protocol is not subject to problems arising from sending control code characters. Also, ZTERM64's Hex conversion is not applicable to Xmodem protocol transfers.

V - View Buffer

Pressing the "V" will cause the buffer to be scrolled to the screen. Press the BREAK key to pause the listing; press BREAK again to EXIT, or press enter to resume listing. At the end of the listing press BREAK to return to the menu.

L - Load Buffer

This command is used to load data into the buffer from tape. This data is assumed to be in a CODE file format.

S - Save Buffer

This command saves the contents of the data buffer to tape. As in the Load command, data is assumed to be in a CODE file format.

X - Xmodem Transmit

This command allows you to send a file using Xmodem protocol. The following question will be asked after selecting this option:

Select Xmodem I/O device (1-4)?

Input the device that your file will originate from, namely:

- 1 - Data Buffer
- 2 - (not used)
- 3 - Zebra Disk Drive
- 4 - User defined device

Y - Xmodem Receive

This command allows you to receive data with Xmodem protocol. The following question will be asked after selecting this option:

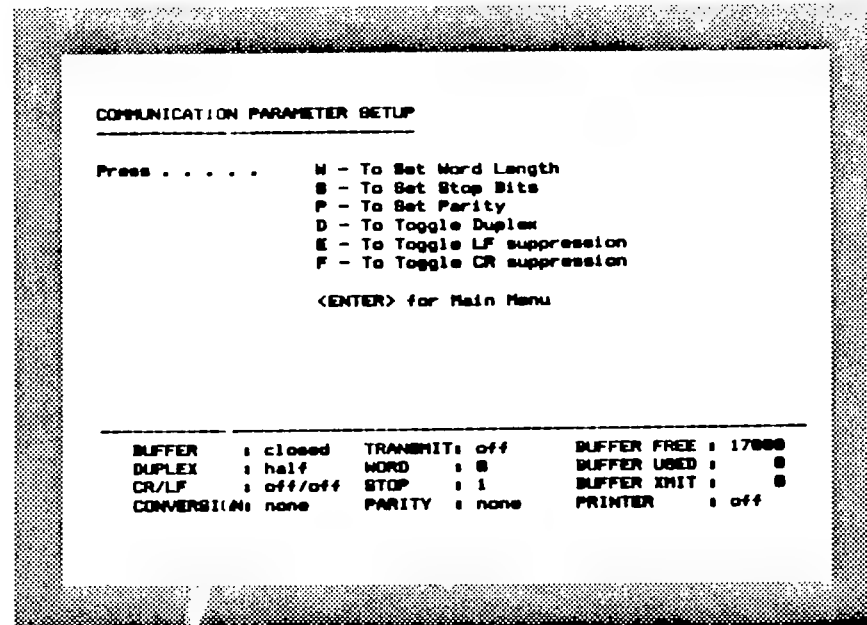
Select Xmodem I/O device (1-4)?

Input the device that your file will be sent to, namely:

- 1 - Data Buffer
- 2 - Screen/Printer
- 3 - Zebra Disk Drive
- 4 - User defined device

A Note on Xmodem Protocol

Xmodem protocol is a method of transferring data between computers. The data is sent out in 128 byte blocks, with a check sum for each block. If the check sum is received incorrectly, then the protocol calls for retransmission of that block until it is received properly.



The settings of your communications parameters are shown in the status display area of your screen.

The procedure for changing any of these settings is quite simple. There are at most four possible settings for any given parameter. Some of the parameters have only two settings, just ON and OFF. To change a setting press the key associated with the parameter. This action will cause the currently selected setting to be changed to one of the other possible settings. The status menu on your lower screen will reflect these new settings.

Below is a list of the possible communication parameter settings.

W - Word Length (5,6,7,8) Word length refers to the number of data bits your modem sends out in a given word. The possibilities are 5,6,7, and 8. The most common setting is 8.

S - Stop Bits (1,2) Stop bits refers to the number of stop bits sent out by your modem at the end of each word. The most common setting is 1.

P - Parity (O,E,N)

Parity refers to whether your modem will send an odd parity bit, an even parity bit, or no parity bit, after the data bits in each word. The most common parity setting for personal bulletin board systems is no parity bit.

D - Duplex Mode (Half/Full) The choice you will want to make for this setting will be determined by the system that you are communicating with. Most modern systems run full duplex.

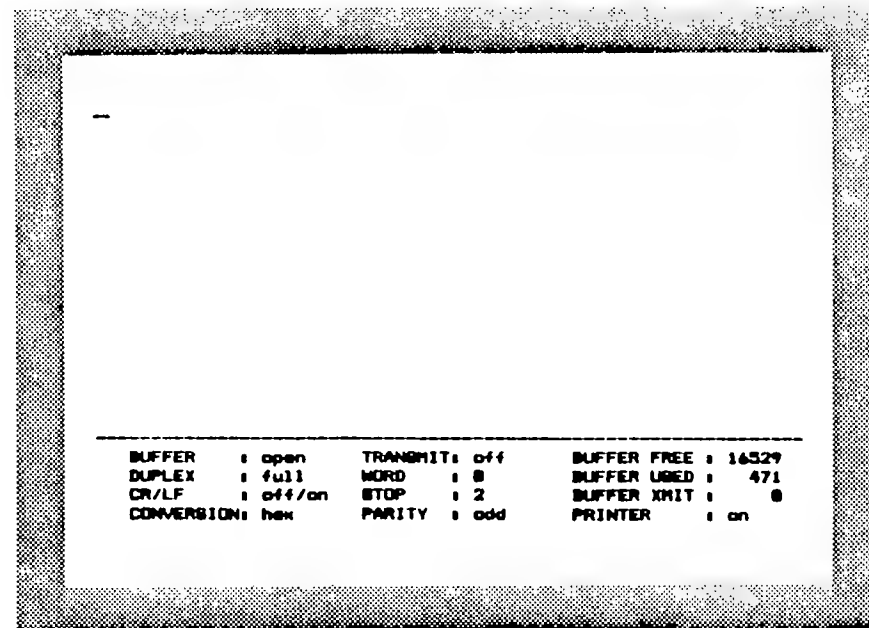
When you are in terminal mode, full duplex is used if your host system echoes back what you type on your keyboard. In full duplex mode when you type a key, it is sent out to the host computer and echoed back over the phone lines to your 2068 which then displays this returned signal on your screen. If an error should occur because of phone line noise or other reason you will probably see the result on your screen.

If you are connected to a host computer or other device that does not echo back what you type on your keyboard, then you will want to be in half duplex mode wherein your keyboard entries will be sent directly by ZTERM64 to your screen display.

NOTE: If you ever find that each key you press is being displayed twice on your screen, you are probably connected to a full duplex host computer, but you have your Z-TERM64 set to half duplex. Each time you press a key ZTERM64 is displaying once directly, and then a second time as it is echoed back from the host computer.

E - Line Feed Supression (On/Off) This setting determines whether or not your screen display will advance a line, or do nothing, in response to a line feed character.

F - Carriage Return Suppression (On/Off) This setting determines whether or not your screen display will return to the beginning of a line, or do nothing, in response to a carriage return character.



TERMINAL MODE

General

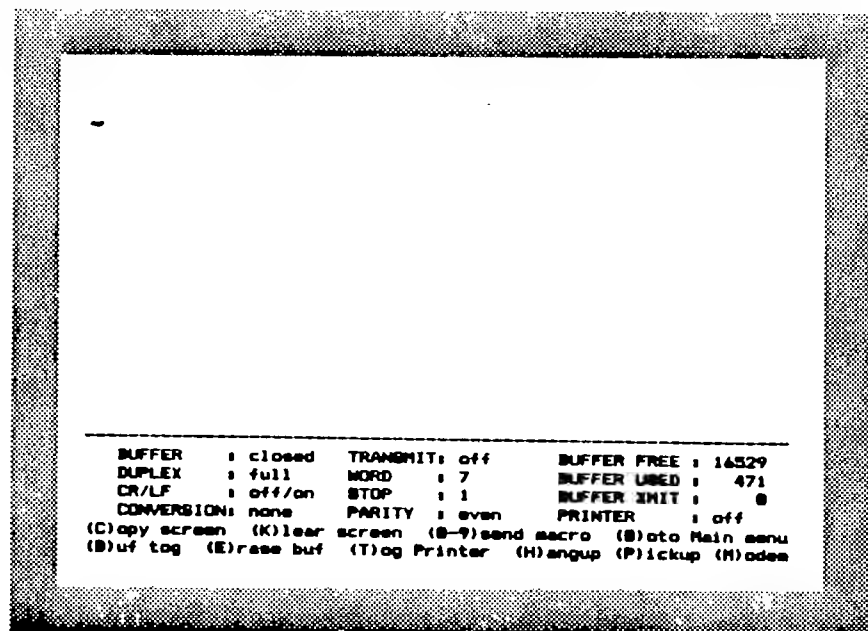
Above is the screen when you enter terminal mode. As you can see, the top of the screen is cleared, and a underline cursor is positioned in the upper left corner. ZTERM64 is now behaving like a standard communications terminal. Everything received on the line will be displayed on screen; everything typed at the keyboard will be both transmitted and displayed on your screen if duplex is half. If duplex is full your key presses will not be displayed.

Control Keys

The following control keys are available in terminal mode.

CAP SHIFT & "I" - Places ZTERM64 in "control" state; the next keypress will be interpreted and transmitted as an ASCII control code.

CAP SHIFT & "8" - Invokes the terminal mode menu. This menu is displayed on the bottom two lines of the screen, below the status menu.



Terminal Mode Menu Options

(C)opy Screen

Press "C" to copy the screen to your 80 column printer.

(K) Clear Screen

Press "k" to clear upper screen.

(0-9) Send Macro

Pressing keys 0 through 9 causes that macro sequence to be transmitted.

(G)oto Main Menu

Returns you to the main menu.

(B)uffer Toggle

Pressing "B" will toggle your buffer between open and closed.

(E)rase Buffer

Press "E" to erase the buffer. As safety precaution, you will be prompted to confirm this.

(T)oggle Printer

Pressing "T" toggles your printer output On/Off. When toggled on, everything displayed to your screen will also be sent to your printer.

(H)ang Up

Press "H" while connected to another computer and you will be disconnected.

(P)ick up

- Pressing "P" causes the modem to disconnect itself from the telephone line, but does not hang up. This allows you to carry on voice communications. NOTE: You must manually pick up your telephone handset before using the pickup command, or connection will be lost.

(M)odem

Pressing "M" causes your modem to start sending carrier tones out on your phone line. This is useful if you wish to use your modem with a telephone service that requires touch-tone dialing. In such a case, you would use either your modem's auto-dial feature or your telephone set to dial the local number. Once you are connected to the service which requires touch-tone dialing, use your touch-tone telephone to dial. Once you are connected to the distant party and you hear a modem tone from the distant computer, use the MODEM command to turn your modem tones on. You should see the CONNECT appear on your display screen. Then hang up your telephone handset. Another use of the MODEM command occurs if you wish to communicate with another computer owner, and both parties intend to use their telephone to talk to each other before connecting their modems to send data. In this case, you would conduct your discussion, and then agree that it is time to turn the modem tones on. You would each do so using the MODEM command and you would see the word connect appear on your display screen. At that point, you can hang up your telephone handset and use your modem. If you attempt to use your modem with the telephone handset off hook, you may get errors, since the handset will pick up noises in the room.

AUTO-ANSWER

ZTERM64 can automatically answer a call from another computer.

When the program is in terminal mode it will auto-answer after four rings. Whatever is sent from the other computer will be displayed, and if the buffer is toggled open, the information received will be stored, (up to 17K).

After auto-answer connect, if a CNTRL-E is received, macro 0 will be transmitted. By placing a transmit buffer character, (pound sterling), in macro 0, you can transmit up to 17k of data automatically.

If you are in terminal mode and not connected, and the phone rings for a voice call, you can avoid modem auto-answer by simply picking up your telephone hand set before four rings.

APPENDIX A

*** ASCII CONTROL SYMBOLS ***

| SYMBOL | CTRL | MEANING |
|--------|-----------------|---|
| NUL | @ | NULL (BLANK) |
| SOH | A | START OF HEADER |
| STX | B | START OF TEXT |
| ETX | C | END OF TEXT |
| EOT | D | END OF XMISSION |
| ENQ | E | ENQUIRY |
| ACK | F | ACKNOWLEDGE (+) |
| BEL | G | BELL |
| BS | H | BACKSPACE |
| HT | I | HORZ TAB (8 SP) |
| LF | J | LINE FEED |
| VT | K | VERTICAL TAB |
| FF | L | SCREEN SCROLL UP |
| CR | M | CARRIAGE RETURN |
| SO | N | CURSOR ON |
| SI | O | CURSOR OFF |
| DLE | P | HALT (BREAK) |
| DC1 | Q | START (XON) |
| DC2 | R | OPEN BUFFER |
| DC3 | S | STOP (XOFF) |
| DC4 | T | CLOSE BUFFER |
| NAK | U | ACKNOWLEDGE (-) |
| SYN | V | SYNCHRONIZATION |
| ETB | W | END TEXT BLOCK |
| CAN | X | CURSOR LEFT 1 COLUMN |
| EM | Y | CURSOR RIGHT 1 COLUMN |
| SUB | Z | CURSOR DOWN 1 LINE |
| ESC | 1 THEN CAP A | CURSOR UP 1 LINE |
| FS | 2 | CURSOR HOME TO FIRST SCREEN POSITION |
| GS | 3 | CURSOR TO START OF SAME LINE |
| RS | 4 | ERASE TO END OF LINE |
| US | 5 | ERASE TO END OF SCREEN |

NOTE: ZTERM64 treats the CAP-SHIFT-1 key on the TS2068 like the control (CTRL) key is treated on most other computers.

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*** NOTES ***

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

*** NOTES ***

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

*** NOTES ***

BULLETIN BOARD DIRECTORY

| BBS NAME | PHONE # | PASSWORD |
|----------|---------|----------|
|----------|---------|----------|

| | | |
|-----------------------------|----------------|--|
| Zebra (evenings & weekends) | (718) 296-2229 | |
|-----------------------------|----------------|--|

BULLETIN BOARD DIRECTORY

| BBS NAME | PHONE # | PASSWORD |
|----------|---------|----------|
|----------|---------|----------|

Zebra (evenings & weekends) (718) 296-2229

ZTERM64

Communications Software
for the TS2068 Computer with
OS-64 Operating System Cartridge
and WC2050 Modem.

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Woodhaven, NY 11421